CANONICAL LIVING OVERVIEW GUIDE

Software Engineering: Architecture, Quality, Testing, and Delivery

A comprehensive software-engineering reference covering requirements, architecture, domain-driven design, APIs, contracts, concurrency, testing, debugging, performance, security, delivery, observability, and maintainability.

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Publication position
This is a living field guide. It is designed for frequent revision while retaining a stable permanent identity. Candidate status means the content is ready for structured use and review but is not represented as an external certification or authority publication.

LEVEL	CLASS	CADENCE	EVIDENCE
L1-L4	FIELD GUIDE	QUARTERLY	SOURCE-BOUND
Foundational through frontier	Practical and educational	Interim updates as needed	Limitations remain visible

Reader orientation

Dimension	Engineering position
Primary domain	MYTHOS-SWE - Software Engineering & Design
Secondary domain	MYTHOS-SEC; MYTHOS-CLD; MYTHOS-DAT; MYTHOS-AI
Audience	Software engineers, technical leads, architects, platform engineers, security engineers, AI-assisted developers, reviewers, and engineering managers.
Prerequisites	Basic programming knowledge. Examples favor Rust, Python, Go, TypeScript, Svelte, and Tauri but the engineering principles are broadly applicable.
Publisher / owner	Mythos Systems / Aaron Stovall
Public classification	Public technical guidance

Expected outcomes

Convert ambiguous product intent into testable requirements, bounded architecture, and traceable delivery plans.

Design modular systems with explicit domain models, contracts, state, concurrency, failure, and ownership.

Build layered testing, debugging, observability, security, and performance practices into ordinary development.

Operate reliable delivery pipelines with provenance, reversible releases, and measurable quality gates.

Use AI-assisted engineering as a governed amplifier rather than a substitute for specification, review, and evidence.

How to use this guide

Read the guide as a progressive system rather than a disconnected encyclopedia. Foundational material establishes the mental model; practitioner sections convert it into repeatable implementation and operations; advanced sections expose architecture, scale, security, and failure behavior; frontier sections describe technologies whose evidence or maturity is still evolving.

> Suggested reading path
> New practitioners should follow the chapters in order and complete the laboratories. Experienced engineers may begin with the architecture, failure, validation, or frontier sections, then use the related-document map to deepen a specific topic.

Learning and assurance model

Level	Reader outcome
L1 - Foundational	Terminology, first principles, component roles, packet or state flow, and simple working examples.
L2 - Practitioner	Implementation, configuration, automation, testing, troubleshooting, and operational evidence.
L3 - Advanced	Architecture, scale, concurrency, resilience, threat models, performance, and complex migrations.
L4 - Frontier	Emerging systems, research directions, technical uncertainty, readiness gates, and adoption signals.

Contents

CHAPTER 01

Engineering intent, requirements, and design

Begin with a shared model of the problem, constraints, users, risks, and verifiable outcomes before choosing implementation mechanisms.

Chapter operating position

Begin with a shared model of the problem, constraints, users, risks, and verifiable outcomes before choosing implementation mechanisms.

1.1 Problem framing and stakeholder outcomes

Problem framing and stakeholder outcomes is treated here as an engineering capability rather than a vocabulary item. Define the user, operational, security, business, and lifecycle outcomes that the system must produce or preserve. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

- Define the authoritative source and ownership boundary for problem framing and stakeholder outcomes.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating problem framing and stakeholder outcomes as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for problem framing and stakeholder outcomes.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

1.2 Functional and quality requirements

Functional and quality requirements is treated here as an engineering capability rather than a vocabulary item. Separate behavior from latency, reliability, security, accessibility, operability, cost, and maintainability requirements. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

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Engineering practices

- Define the authoritative source and ownership boundary for functional and quality requirements.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating functional and quality requirements as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
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Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for functional and quality requirements.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

1.3 Specifications, acceptance criteria, and traceability

Specifications, acceptance criteria, and traceability is treated here as an engineering capability rather than a vocabulary item. Write requirements that can be tested and connect them through architecture, code, tests, release evidence, and observed outcomes. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

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Engineering practices

Define the authoritative source and ownership boundary for specifications, acceptance criteria, and traceability.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating specifications, acceptance criteria, and traceability as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for specifications, acceptance criteria, and traceability.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

1.4 Architecture decision records and reversibility

Architecture decision records and reversibility is treated here as an engineering capability rather than a vocabulary item. Record context, alternatives, rationale, consequences, uncertainty, and review triggers for significant decisions. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

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Engineering practices

Define the authoritative source and ownership boundary for architecture decision records and reversibility.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating architecture decision records and reversibility as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for architecture decision records and reversibility.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

Chapter 01 laboratory and review

Practical laboratory

Choose a small application idea and produce a problem statement, actors, use cases, quality-attribute scenarios, acceptance criteria, constraints, risks, and three architecture decision records.

Laboratory evidence package

- Architecture or topology showing boundaries, identities, dependencies, and authoritative inputs.
- Versioned configuration or code with explanatory comments and reproducible setup instructions.
- Nominal-path validation plus at least two injected failure or boundary conditions.
- Structured logs, traces, metrics, packet captures, test output, or other appropriate evidence.
- A concise decision record covering findings, limitations, residual risks, and next actions.

Frontier extension

Extend specifications into machine-readable contracts, executable models, property checks, and agent-consumable build plans that remain reviewable by humans.

Review gate

Advance only when another engineer can reproduce the result, explain the architecture, identify the failure boundary, and distinguish measured evidence from assumptions or projections.

CHAPTER 02

Architecture, domain modeling, and modularity

Shape software around domain behavior, stable boundaries, clear ownership, and replaceable implementation details.

Chapter operating position

Shape software around domain behavior, stable boundaries, clear ownership, and replaceable implementation details.

2.1 Domain-driven design and bounded contexts

Domain-driven design and bounded contexts is treated here as an engineering capability rather than a vocabulary item. Model language, entities, values, aggregates, invariants, events, services, and context boundaries around business behavior. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

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Engineering practices

- Define the authoritative source and ownership boundary for domain-driven design and bounded contexts.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating domain-driven design and bounded contexts as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for domain-driven design and bounded contexts.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

2.2 Modules, cohesion, coupling, and dependencies

Modules, cohesion, coupling, and dependencies is treated here as an engineering capability rather than a vocabulary item. Group behavior that changes together, minimize knowledge across boundaries, and enforce dependency direction. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

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Engineering practices

- Define the authoritative source and ownership boundary for modules, cohesion, coupling, and dependencies.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating modules, cohesion, coupling, and dependencies as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for modules, cohesion, coupling, and dependencies.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

2.3 Ports, adapters, and layered architecture

Ports, adapters, and layered architecture is treated here as an engineering capability rather than a vocabulary item. Keep domain policy independent from transport, storage, frameworks, vendors, and user-interface mechanisms. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

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Engineering practices

- Define the authoritative source and ownership boundary for ports, adapters, and layered architecture.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating ports, adapters, and layered architecture as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for ports, adapters, and layered architecture.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

2.4 Monoliths, modular monoliths, and services

Monoliths, modular monoliths, and services is treated here as an engineering capability rather than a vocabulary item. Select deployment and ownership boundaries based on scale, autonomy, failure, data, and operational capacity rather than fashion. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

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Engineering practices

- Define the authoritative source and ownership boundary for monoliths, modular monoliths, and services.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating monoliths, modular monoliths, and services as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for monoliths, modular monoliths, and services.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

Chapter 02 laboratory and review

Practical laboratory
Refactor a small feature into a bounded domain module with ports for storage and external services. Prove the domain behavior with tests that do not require the framework or database.

Laboratory evidence package

- Architecture or topology showing boundaries, identities, dependencies, and authoritative inputs.
- Versioned configuration or code with explanatory comments and reproducible setup instructions.
- Nominal-path validation plus at least two injected failure or boundary conditions.
- Structured logs, traces, metrics, packet captures, test output, or other appropriate evidence.
- A concise decision record covering findings, limitations, residual risks, and next actions.

Frontier extension

Explore cell architectures, actor systems, deterministic runtimes, capability-oriented modules, and architecture graphs used by AI development agents.

Review gate
Advance only when another engineer can reproduce the result, explain the architecture, identify the failure boundary, and distinguish measured evidence from assumptions or projections.

CHAPTER 03

APIs, contracts, data, and state

Engineer interfaces and state transitions so behavior remains compatible, observable, recoverable, and evolvable.

Chapter operating position

Engineer interfaces and state transitions so behavior remains compatible, observable, recoverable, and evolvable.

3.1 API and protocol design

API and protocol design is treated here as an engineering capability rather than a vocabulary item. Define resources, commands, events, errors, pagination, idempotency, security, rate behavior, and lifecycle before selecting syntax. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

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Engineering practices

- Define the authoritative source and ownership boundary for api and protocol design.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating api and protocol design as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for api and protocol design.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

3.2 Typed contracts and schema evolution

Typed contracts and schema evolution is treated here as an engineering capability rather than a vocabulary item. Use explicit types, validation, compatibility rules, generated clients, consumer tests, and migration policy across boundaries. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

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Engineering practices

- Define the authoritative source and ownership boundary for typed contracts and schema evolution.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating typed contracts and schema evolution as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for typed contracts and schema evolution.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

3.3 Transactions, consistency, and invariants

Transactions, consistency, and invariants is treated here as an engineering capability rather than a vocabulary item. Place atomicity around domain invariants and make eventual consistency, retries, duplicates, and conflict resolution visible. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

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Engineering practices

Define the authoritative source and ownership boundary for transactions, consistency, and invariants.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating transactions, consistency, and invariants as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for transactions, consistency, and invariants.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

3.4 Event sourcing, CQRS, and durable workflows

Event sourcing, CQRS, and durable workflows is treated here as an engineering capability rather than a vocabulary item. Use event histories, separated read models, and durable orchestration when auditability and long-running recovery justify the complexity. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

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Engineering practices

Define the authoritative source and ownership boundary for event sourcing, cqrs, and durable workflows.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating event sourcing, cqrs, and durable workflows as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for event sourcing, cqrs, and durable workflows.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

Chapter 03 laboratory and review

Practical laboratory

Design an API and event contract for a stateful workflow. Implement idempotency, optimistic concurrency, version compatibility, retry safety, and a migration from one schema version to another.

Laboratory evidence package

- Architecture or topology showing boundaries, identities, dependencies, and authoritative inputs.
- Versioned configuration or code with explanatory comments and reproducible setup instructions.
- Nominal-path validation plus at least two injected failure or boundary conditions.
- Structured logs, traces, metrics, packet captures, test output, or other appropriate evidence.
- A concise decision record covering findings, limitations, residual risks, and next actions.

Frontier extension

Evaluate semantic interfaces, typed UI protocols, local-first synchronization, verifiable event histories, and agent-generated contract tests.

Review gate

Advance only when another engineer can reproduce the result, explain the architecture, identify the failure boundary, and distinguish measured evidence from assumptions or projections.

CHAPTER 04

Concurrency, asynchronous systems, and resilience

Make ownership, cancellation, backpressure, ordering, time, and partial failure explicit in concurrent and distributed software.

Chapter operating position

Make ownership, cancellation, backpressure, ordering, time, and partial failure explicit in concurrent and distributed software.

4.1 Concurrency models and shared state

Concurrency models and shared state is treated here as an engineering capability rather than a vocabulary item. Compare threads, async tasks, actors, channels, immutable messages, locks, and data ownership according to workload and failure needs. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

- Define the authoritative source and ownership boundary for concurrency models and shared state.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating concurrency models and shared state as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for concurrency models and shared state.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

4.2 Cancellation, timeout, retry, and idempotency

Cancellation, timeout, retry, and idempotency is treated here as an engineering capability rather than a vocabulary item. Propagate cancellation, bound work, classify errors, control retries, and prevent duplicate effects. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

- Define the authoritative source and ownership boundary for cancellation, timeout, retry, and idempotency.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating cancellation, timeout, retry, and idempotency as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for cancellation, timeout, retry, and idempotency.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

4.3 Backpressure, queues, and load shedding

Backpressure, queues, and load shedding is treated here as an engineering capability rather than a vocabulary item. Protect systems by bounding buffers, signaling demand, rejecting excess work intentionally, and preserving priority. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

Define the authoritative source and ownership boundary for backpressure, queues, and load shedding.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating backpressure, queues, and load shedding as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for backpressure, queues, and load shedding.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

4.4 Resilience patterns and failure containment

Resilience patterns and failure containment is treated here as an engineering capability rather than a vocabulary item. Apply circuit breakers, bulkheads, leases, sagas, health models, and degraded modes with observable state. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

Define the authoritative source and ownership boundary for resilience patterns and failure containment.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating resilience patterns and failure containment as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for resilience patterns and failure containment.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

Chapter 04 laboratory and review

Practical laboratory

Build a concurrent worker service with bounded queues, cancellation, deadlines, retries, idempotent effects, and load shedding. Inject slow dependencies, duplicate messages, and process termination.

Laboratory evidence package

- Architecture or topology showing boundaries, identities, dependencies, and authoritative inputs.
- Versioned configuration or code with explanatory comments and reproducible setup instructions.
- Nominal-path validation plus at least two injected failure or boundary conditions.
- Structured logs, traces, metrics, packet captures, test output, or other appropriate evidence.
- A concise decision record covering findings, limitations, residual risks, and next actions.

Frontier extension

Explore structured concurrency, deterministic simulation, distributed actors, durable execution, serverless orchestration, and formally checked failure protocols.

Review gate

Advance only when another engineer can reproduce the result, explain the architecture, identify the failure boundary, and distinguish measured evidence from assumptions or projections.

CHAPTER 05

Testing, verification, and quality engineering

Use layered evidence to prove behavior, expose assumptions, prevent regression, and validate the system under realistic failure.

Chapter operating position

Use layered evidence to prove behavior, expose assumptions, prevent regression, and validate the system under realistic failure.

5.1 Test strategy and the evidence pyramid

Test strategy and the evidence pyramid is treated here as an engineering capability rather than a vocabulary item. Balance unit, component, integration, contract, system, end-to-end, exploratory, and production validation according to risk. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

- Define the authoritative source and ownership boundary for test strategy and the evidence pyramid.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating test strategy and the evidence pyramid as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for test strategy and the evidence pyramid.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

5.2 Property-based, fuzz, mutation, and model testing

Property-based, fuzz, mutation, and model testing is treated here as an engineering capability rather than a vocabulary item. Generate broad input and state coverage, challenge assumptions, and measure whether tests detect meaningful defects. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

- Define the authoritative source and ownership boundary for property-based, fuzz, mutation, and model testing.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating property-based, fuzz, mutation, and model testing as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for property-based, fuzz, mutation, and model testing.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

5.3 Testability, fixtures, and deterministic environments

Testability, fixtures, and deterministic environments is treated here as an engineering capability rather than a vocabulary item. Design controllable clocks, randomness, dependencies, state, and failure injection so results remain reproducible. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

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Engineering practices

Define the authoritative source and ownership boundary for testability, fixtures, and deterministic environments.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating testability, fixtures, and deterministic environments as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for testability, fixtures, and deterministic environments.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

5.4 Formal methods and executable specifications

Formal methods and executable specifications is treated here as an engineering capability rather than a vocabulary item. Use state machines, invariants, temporal logic, model checking, and proofs where failure consequence justifies them. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

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Engineering practices

Define the authoritative source and ownership boundary for formal methods and executable specifications.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating formal methods and executable specifications as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for formal methods and executable specifications.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

Chapter 05 laboratory and review

Practical laboratory
Create a layered test plan for a workflow service and implement unit, property, integration, contract, fuzz, and failure-injection tests. Document what each layer proves and cannot prove.

Laboratory evidence package

Architecture or topology showing boundaries, identities, dependencies, and authoritative inputs.

Versioned configuration or code with explanatory comments and reproducible setup instructions.

Nominal-path validation plus at least two injected failure or boundary conditions.

Structured logs, traces, metrics, packet captures, test output, or other appropriate evidence.

A concise decision record covering findings, limitations, residual risks, and next actions.

Frontier extension

Explore proof-guided development, deterministic replay, verified compilers and runtimes, AI-generated tests evaluated by mutation, and continuous production verification.

Review gate
Advance only when another engineer can reproduce the result, explain the architecture, identify the failure boundary, and distinguish measured evidence from assumptions or projections.

CHAPTER 06

Debugging, observability, and performance

Diagnose systems through reproducible hypotheses and optimize only after measuring behavior across code, runtime, dependencies, and infrastructure.

Chapter operating position

Diagnose systems through reproducible hypotheses and optimize only after measuring behavior across code, runtime, dependencies, and infrastructure.

6.1 Debugging method and causal reasoning

Debugging method and causal reasoning is treated here as an engineering capability rather than a vocabulary item. Start from a precise symptom and timeline, minimize the reproduction, inspect state, test hypotheses, and preserve findings. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

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Engineering practices

- Define the authoritative source and ownership boundary for debugging method and causal reasoning.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating debugging method and causal reasoning as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for debugging method and causal reasoning.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

6.2 Logs, metrics, traces, profiles, and dumps

Logs, metrics, traces, profiles, and dumps is treated here as an engineering capability rather than a vocabulary item. Choose evidence according to the question and correlate events with stable identities, versions, deployments, and requests. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

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Engineering practices

- Define the authoritative source and ownership boundary for logs, metrics, traces, profiles, and dumps.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating logs, metrics, traces, profiles, and dumps as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for logs, metrics, traces, profiles, and dumps.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

6.3 Performance measurement and benchmarking

Performance measurement and benchmarking is treated here as an engineering capability rather than a vocabulary item. Separate latency distributions, throughput, resource use, contention, allocation, I/O, warmup, and workload realism. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

- Define the authoritative source and ownership boundary for performance measurement and benchmarking.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating performance measurement and benchmarking as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for performance measurement and benchmarking.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

6.4 Optimization and complexity control

Optimization and complexity control is treated here as an engineering capability rather than a vocabulary item. Optimize the measured bottleneck while preserving correctness, readability, observability, and rollback. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

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Engineering practices

Define the authoritative source and ownership boundary for optimization and complexity control.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating optimization and complexity control as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for optimization and complexity control.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

Chapter 06 laboratory and review

Practical laboratory

Diagnose a deliberately degraded service using logs, traces, metrics, CPU and memory profiles, and controlled experiments. Fix one correctness issue and one bottleneck and compare before-and-after evidence.

Laboratory evidence package

Architecture or topology showing boundaries, identities, dependencies, and authoritative inputs.

Versioned configuration or code with explanatory comments and reproducible setup instructions.

Nominal-path validation plus at least two injected failure or boundary conditions.

Structured logs, traces, metrics, packet captures, test output, or other appropriate evidence.

A concise decision record covering findings, limitations, residual risks, and next actions.

Frontier extension

Explore continuous profiling, eBPF, causal observability, hardware-aware scheduling, profile-guided optimization, and AI-assisted debugging that cites exact evidence.

Review gate

Advance only when another engineer can reproduce the result, explain the architecture, identify the failure boundary, and distinguish measured evidence from assumptions or projections.

CHAPTER 07

Security, dependencies, and trustworthy delivery

Protect software from design through source, dependency, build, artifact, deployment, runtime, and recovery.

Chapter operating position

Protect software from design through source, dependency, build, artifact, deployment, runtime, and recovery.

7.1 Secure coding and misuse resistance

Secure coding and misuse resistance is treated here as an engineering capability rather than a vocabulary item. Validate input, encode output, enforce authorization, protect secrets, constrain resources, and design safe error behavior. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

- Define the authoritative source and ownership boundary for secure coding and misuse resistance.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating secure coding and misuse resistance as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for secure coding and misuse resistance.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

7.2 Dependency and supply-chain governance

Dependency and supply-chain governance is treated here as an engineering capability rather than a vocabulary item. Control package sources, versions, updates, licenses, vulnerabilities, maintainers, transitive risk, and removal paths. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

Define the authoritative source and ownership boundary for dependency and supply-chain governance.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating dependency and supply-chain governance as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for dependency and supply-chain governance.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

7.3 Build provenance, signing, and release integrity

Build provenance, signing, and release integrity is treated here as an engineering capability rather than a vocabulary item. Retain source, toolchain, environment, test, signer, artifact, and deployment evidence and verify it before execution. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

Define the authoritative source and ownership boundary for build provenance, signing, and release integrity.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating build provenance, signing, and release integrity as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for build provenance, signing, and release integrity.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

7.4 Secrets, configuration, and runtime hardening

Secrets, configuration, and runtime hardening is treated here as an engineering capability rather than a vocabulary item. Separate code from environment configuration, use short-lived credentials, minimize privilege, and monitor policy drift. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

Define the authoritative source and ownership boundary for secrets, configuration, and runtime hardening.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating secrets, configuration, and runtime hardening as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for secrets, configuration, and runtime hardening.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

Chapter 07 laboratory and review

Practical laboratory
Create a secure release for a small service with dependency policy, SBOM, signed artifact, provenance, secret injection, least privilege, automated verification, and rollback.

Laboratory evidence package

- Architecture or topology showing boundaries, identities, dependencies, and authoritative inputs.
- Versioned configuration or code with explanatory comments and reproducible setup instructions.
- Nominal-path validation plus at least two injected failure or boundary conditions.
- Structured logs, traces, metrics, packet captures, test output, or other appropriate evidence.
- A concise decision record covering findings, limitations, residual risks, and next actions.

Frontier extension

Evaluate reproducible and hermetic builds, memory-safe rewrites, confidential build systems, transparency logs, and verifiable deployment state.

Review gate
Advance only when another engineer can reproduce the result, explain the architecture, identify the failure boundary, and distinguish measured evidence from assumptions or projections.

CHAPTER 08

Delivery, maintenance, and engineering systems

Operate software as a long-lived socio-technical system with reliable releases, documentation, ownership, and continuous improvement.

Chapter operating position

Operate software as a long-lived socio-technical system with reliable releases, documentation, ownership, and continuous improvement.

8.1 CI/CD and progressive delivery

CI/CD and progressive delivery is treated here as an engineering capability rather than a vocabulary item. Build fast feedback, independent gates, environments, canaries, feature controls, rollback, and post-deployment validation. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

- Define the authoritative source and ownership boundary for ci/cd and progressive delivery.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating ci/cd and progressive delivery as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for ci/cd and progressive delivery.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

8.2 Repository and developer experience

Repository and developer experience is treated here as an engineering capability rather than a vocabulary item. Make structure, commands, dependencies, local setup, tests, architecture, and contribution expectations discoverable and consistent. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

- Define the authoritative source and ownership boundary for repository and developer experience.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating repository and developer experience as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for repository and developer experience.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

8.3 Code review, technical debt, and refactoring

Code review, technical debt, and refactoring is treated here as an engineering capability rather than a vocabulary item. Review for correctness, design, security, tests, operations, and clarity while managing debt through explicit value and risk. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

- Define the authoritative source and ownership boundary for code review, technical debt, and refactoring.
- Make preconditions, invariants, error states, and recovery actions explicit.
- Instrument the critical path with stable identifiers, timestamps, and outcome codes.
- Validate in a representative environment before widening blast radius.
- Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

- Treating code review, technical debt, and refactoring as a product feature rather than an end-to-end engineering behavior.
- Automating an undocumented process and scaling its ambiguity.
- Relying on a happy-path demonstration without degraded-state or rollback testing.
- Using aggregate dashboards without retaining trace-level evidence.
- Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for code review, technical debt, and refactoring.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

8.4 Documentation, ownership, and lifecycle

Documentation, ownership, and lifecycle is treated here as an engineering capability rather than a vocabulary item. Maintain architecture, interfaces, operations, decisions, support, deprecation, migration, and end-of-life knowledge with the code. The design objective is to make the behavior understandable before it is automated, measurable before it is optimized, and recoverable before it is scaled.

Within MYTHOS-SWE - Software Engineering & Design, this capability should be represented through explicit boundaries, typed or otherwise enforceable contracts, observable state transitions, and named owners. A production design separates intent from mechanism, control-plane decisions from data-plane execution, and nominal behavior from degraded or adversarial behavior. The resulting system is easier to test, review, migrate, and operate because its assumptions are visible rather than embedded in tribal knowledge.

Implementation begins with a small, inspectable baseline. Establish the authoritative inputs, expected outputs, invariants, timeout and retry behavior, identity context, telemetry, and rollback path. Only then add abstraction, concurrency, orchestration, optimization, or autonomous behavior. This sequence prevents sophistication from hiding incomplete fundamentals and makes later evidence comparable across revisions.

Engineering practices

Define the authoritative source and ownership boundary for documentation, ownership, and lifecycle.

Make preconditions, invariants, error states, and recovery actions explicit.

Instrument the critical path with stable identifiers, timestamps, and outcome codes.

Validate in a representative environment before widening blast radius.

Capture repeatable evidence so another engineer can reproduce the conclusion.

Failure patterns

Treating documentation, ownership, and lifecycle as a product feature rather than an end-to-end engineering behavior.

Automating an undocumented process and scaling its ambiguity.

Relying on a happy-path demonstration without degraded-state or rollback testing.

Using aggregate dashboards without retaining trace-level evidence.

Allowing ownership, version, or authority to become implicit.

Validation and evidence

Method	Expected evidence
Examine	Architecture, configuration, contracts, runbooks, and source authority for documentation, ownership, and lifecycle.
Interview	Engineers and operators responsible for design, implementation, review, and incident ownership.
Test	Nominal, boundary, failure, timeout, recovery, and rollback scenarios with retained evidence.
Measure	Correctness, latency, reliability, resource use, security outcomes, and operator effort.

Chapter 08 laboratory and review

Practical laboratory

Design a delivery system for a representative application from commit through build, test, security gates, canary, monitoring, rollback, documentation, and release evidence.

Laboratory evidence package

Architecture or topology showing boundaries, identities, dependencies, and authoritative inputs.

Versioned configuration or code with explanatory comments and reproducible setup instructions.

Nominal-path validation plus at least two injected failure or boundary conditions.

Structured logs, traces, metrics, packet captures, test output, or other appropriate evidence.

A concise decision record covering findings, limitations, residual risks, and next actions.

Frontier extension

Explore developer portals, agentic engineering teams, executable documentation, policy-aware code generation, self-healing delivery, and evidence-driven engineering management.

Review gate

Advance only when another engineer can reproduce the result, explain the architecture, identify the failure boundary, and distinguish measured evidence from assumptions or projections.

Integrated learning roadmap

The guide is intended to be revisited. First establish fluency, then build a small implementation, operate it under failure, automate repeatable work, and finally evaluate emerging techniques against a stable baseline. Progress is demonstrated through evidence rather than reading completion alone.

Stage	Demonstrated capability
Foundation	Explain the system from first principles and trace its critical path without relying on product terminology.
Build	Implement the smallest representative system with explicit contracts, identities, telemetry, and tests.
Operate	Diagnose injected failures, recover safely, and preserve evidence of the causal chain.
Automate	Convert a proven manual workflow into bounded, idempotent, observable automation.
Architect	Design for scale, resilience, security, interoperability, and lifecycle change.
Explore	Evaluate frontier techniques using stated hypotheses, limitations, and adoption gates.

Source authority register

Source policy
Official standards, specifications, and project documentation remain with their issuing organizations. Mythos Systems provides original engineering interpretation, synthesis, implementation guidance, and relationship mapping. Source verification dates do not guarantee that an authority has not changed since review.

01. NIST - SP 800-218 - Secure Software Development Framework
Role: Secure software development practices.
Verified: 2026-07-26
Official source: https://csrc.nist.gov/pubs/sp/800/218/final

02. OWASP - Application Security Verification Standard
Role: Application-security verification requirements.
Verified: 2026-07-26
Official source: https://owasp.org/www-project-application-security-verification-standard/

03. IETF / RFC Editor - RFC 9110 - HTTP Semantics
Role: Protocol semantics and interoperability reference.
Verified: 2026-07-26
Official source: https://www.rfc-editor.org/rfc/rfc9110

04. OpenTelemetry - Semantic Conventions
Role: Telemetry semantic conventions for distributed systems and generative AI.
Verified: 2026-07-26
Official source: https://opentelemetry.io/docs/specs/semconv/

05. NIST - SP 800-160 Volume 1 - Engineering Trustworthy Secure Systems
Role: Systems security engineering authority.
Verified: 2026-07-26
Official source: https://csrc.nist.gov/pubs/sp/800/160/v1/r1/final

06. Tauri - Tauri 2 Architecture and Documentation
Role: Desktop application architecture and security boundary reference.
Verified: 2026-07-26
Official source: https://v2.tauri.app/concept/architecture/

07. Svelte - Svelte Documentation
Role: Svelte framework and reactive UI reference.
Verified: 2026-07-26
Official source: https://svelte.dev/docs

08. NIST - Artificial Intelligence Risk Management Framework 1.0
Role: AI risk, governance, measurement, and management framework.
Verified: 2026-07-26
Official source: https://www.nist.gov/itl/ai-risk-management-framework

Authority application and refresh triggers

Authority class	Required library action
Protocols and specifications	Recheck interoperability, security considerations, defaults, and migration guidance when a referenced specification changes.
Security and assurance frameworks	Update control mappings, evidence expectations, risk language, and assessment procedures after material framework revision.
Languages, runtimes, and projects	Re-run examples, tests, deprecation checks, and operational recommendations against supported releases.
Benchmarks and evaluations	Re-execute claims when workloads, methods, models, compilers, drivers, hardware, or scoring rules change.
Operational evidence	Incorporate validated incidents, failure tests, reader corrections, and measured implementation outcomes into the next revision.

Limitations, freshness, and revision control

Boundary	Statement
Publication limitation	This guide synthesizes broad engineering practice. It does not replace product documentation, legal advice, safety certification, or environment-specific design review.
Evidence limitation	Not every pattern is benchmarked in every environment. Examples illustrate engineering methods and must be validated against actual versions, workloads, hardware, policy, and failure conditions.
Freshness limitation	Vendor behavior, software libraries, AI models, security threats, and emerging standards can change quickly. Volatile claims require source revalidation before operational adoption.
Adoption limitation	Frontier content is not an implicit adoption recommendation. Adoption requires defined value, qualification gates, controlled proof, rollback, ownership, and residual-risk acceptance.
Status boundary	Candidate Living Guide describes the publication, not certification of a product, implementation, engineer, or organization.

Revision record

Version	Revision statement
1.0.0-candidate	Initial candidate living-guide edition. Published 2026-07-26; scheduled review 2026-10-26.

Search and relationship metadata

Dimension	Engineering position
Primary domain	MYTHOS-SWE - Software Engineering & Design
Secondary domain	MYTHOS-SEC; MYTHOS-CLD; MYTHOS-DAT; MYTHOS-AI
Publication class	Field Guide / Canonical Living Overview Guide
Skill levels	L1 Foundational; L2 Practitioner; L3 Advanced; L4 Frontier
Tags	software engineering, architecture, DDD, APIs, contracts, concurrency, testing, debugging, performance, secure software, CI/CD, maintainability
Canonical route	/library/field-guides/mythos-guide-swe-0001/

Living publication

Corrections, expanded laboratories, improved diagrams, authority changes, and new engineering evidence should revise this permanent publication rather than create disconnected replacements.